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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/780,989	02/09/2001	Timothy G. Adams	50376	5885

7590 05/22/2002

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Boston, MA 02109

EXAMINER

CLARKE, YVETTE M

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 05/22/2002

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/780,989

Applicant(s)

ADAMS ET AL.

Examiner

Yvette M Clarke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

This is written in reference to application number 09/780989 filed on February 9, 2001.

#### *Information Disclosure Statement*

1. The Information Disclosure Statement filed on December 18, 2001 has been entered and fully considered.

#### *Preliminary Amendment*

2. The preliminary amendment filed on February 9, 2001 has been entered and fully considered.

#### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

4. Claims 1-18 and 20-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "reactive to crosslinking" renders the claims indefinite. The examiner is unclear as to how the group is reactive to crosslinking.

Furthermore, it is unclear how "at least one portion of the group 1" can be crosslinked to other polymer if the said group is not required to be crosslinked. Clarification is requested.

5. Claims 16-18, 22 and 24-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 17, 25 and 22 depend upon themselves. It is unclear to the examiner what the applicant is claiming as his invention. For the purposes of examination, the examiner has applied the following interpretation: claims 16-18 are

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dependent upon claim 15; claim 22 depends upon 21; and claims 24-25 depend upon claim 23.

Furthermore, claim 16 depends on claim 17; and claim 24 depends on claim 25.

Claims should depend on preceding claims. (MPEP 608.01(n)).

It is also unclear to the examiner if claim 18 is intended to further limit claim 17.

Claim <sup>17</sup>18 refers to a wavelength of about 248 nm. It is unclear to the examiner if the term "about" encompasses a wavelength of lower than 200 nm as set forth in claim 18.

### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

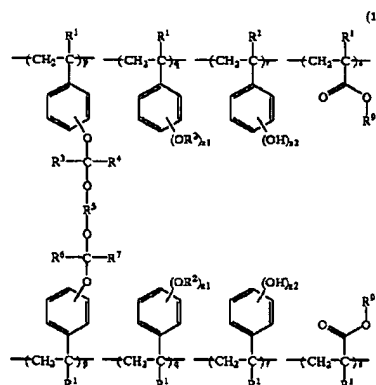
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

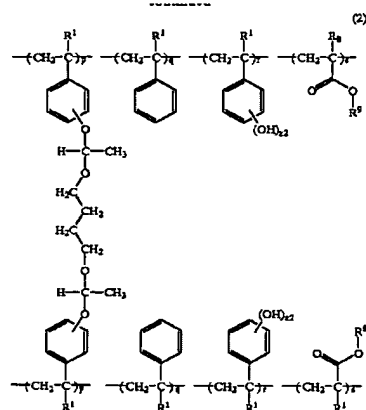
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

7. Claims 1-5, 7-8, 10-19 and 21-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Takeda et al. (US 6156481 A) with Sato (US 5817444 A) cited to show inherent properties. Takeda teaches a positive working resist composition comprising



recurring units to the general formula (1)

or (2)

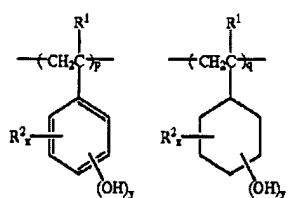


. In the said polymer some phenolic hydroxyl groups are crosslinked with acid labile groups (c. 3, l. 43-44). When such a polymer is blended as a base resin in a resist composition, the crosslinking with acid labile groups offer the composition the advantages of enhanced dissolution inhibition and an increased dissolution contrast after exposure (c. 3, l. 45-49). The said polymer is prepared by introducing acid labile crosslinking groups into a hydroxystyrene-(meth)acrylate copolymer through chemical reaction. This crosslinking reaction is effected by adding some of the hydrogen atoms of hydroxyl groups in hydroxystyrene units to vinyl groups of a divinyl ether compounds such as 1,4-butanediol divinyl ether and ethylene glycol divinyl ether in the presence of an acid catalyst (c. 7, l. 47-c. 8, l. 35). Takeda teaches that the taught compositions is best suited to fine pattern formation with deep UV rays having a wavelength of 193 to 254 nm and electron beams (c.

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15, l. 2-6). Synthetic example 5 exemplifies the crosslinking of a polymer of  $\alpha$ -methylhydroxystyrene/1-ethylcyclopentyl methacrylate with 1,4-butanediol dichloroethyl ether (c. 16, l. 45-67). The formed crosslinked polymers are then admixed with triphenylsulfonium p-toluenesulfonate as the photoactive component (e.g. acid generator) to form a resist composition. The said composition was coated on a silicon wafer, baked, exposed and developed to form a positive pattern (c. 17, l. 10-35). Exposure was performed with an excimer laser stepper (NSR-2005EX8A) from Nikon Corporation. Sato (US 5817444 A) teaches that the said excimer laser stepper emits light at the wavelength of 248 nm (c. 11, l. 58-61).

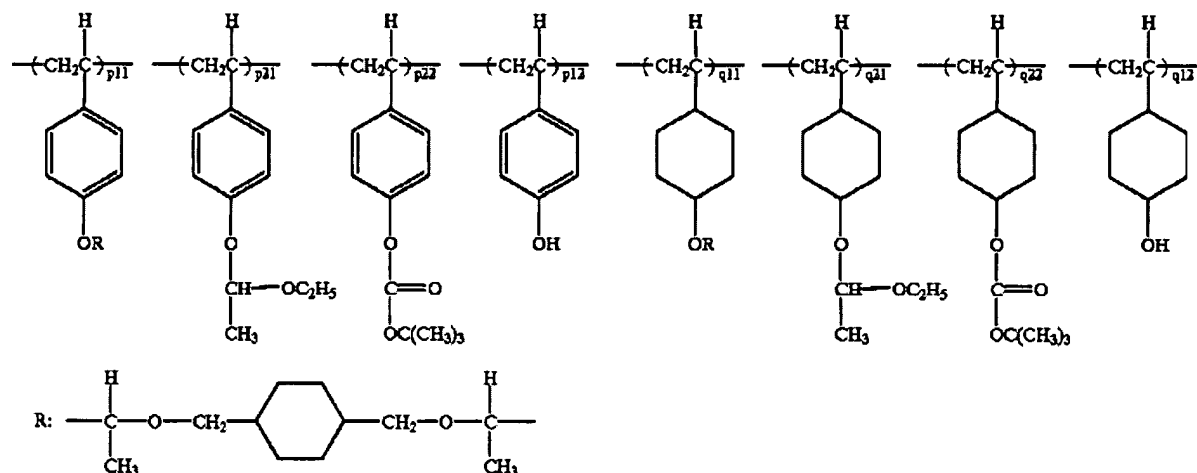
8. Claims 1-8 and 10-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimada et al. (US 6033828 A) with Sato et al. (US 5817444 A) cited to show inherent properties. Shimada teaches a polymer comprising recurring units formula (1):



wherein some of the hydrogen atoms of phenolic hydroxyl groups and/or alcoholic hydroxyl groups are replaced by acid labile groups. The polymer is crosslinked within a molecule and/or between molecules with a crosslinking group having C-O-C linkage resulting from a reaction of some remaining phenolic hydroxyl groups and/or alcoholic hydroxyl groups with an alkenyl ether compound or halogenated alkyl ether compound (abstract). Synthesis example 5 exemplifies the crosslinking reaction of polyhydroxystyrene in the presence of ethyl vinyl ether and cyclohexane dimethanol divinyl

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ether to form a polymer of formula (Polym. 2):



(c. 80, l. 5-45). The said polymer is admixed with a photoacid generator, a basic compound, a dissolution regulator, an aromatic compound, UV absorber and a solvent to form a photoresist composition. Shimada teaches that the taught resist composition is best suited for fine patterning with actinic radiation especially radiation having a wavelength of 254-193 nm such as deep UV, excimer laser light, X-ray and electron beam. Outside the range, a failure to provide the desired pattern can occur (c. 78, l. 48-54). The said composition is coated on a silicon wafer, exposed and developed to form a positive pattern (c. 99, l. 45-c. 100, l. 67). Exposure was performed with an excimer laser stepper (NSR-2005EX) from Nikon Corporation. Sato teaches that the said excimer laser stepper emits light at the wavelength of 248 nm (c. 11, l. 58-61).

9. Claims 1-7, 9-11, 15-16, 21-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Winkle (US 5650261 A). Winkle teaches a positive acting photoresist comprising a photoacid, a photobase and a film forming acid hardening resin system. The said composition produces crosslinked images (abstract). Example 1 exemplifies the

preparation of polymer A that is a terpolymer of 2-hydroxyethyl methacrylate/methyl methacrylate/butyl methacrylate. The said copolymer is admixed with a melamine crosslinker to form a photoresist composition. The composition is coated onto a silicon wafer, exposed and developed to form a positive image.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Nakashima et al. (US 6309796 B1) which teaches a resist composition comprising a high molecular weight silicone compound.
- Schulz et al. (US 6306555 B1) which teaches an iodonium salt as a latent acid donor.
- Motomi et al. (US 6156477 A) which teaches polymers and chemically amplified positive resist compositions.
- Satoshi et al. (US 6136502A) which teaches a resist composition and patterning process.
- Kumar et al. (US 6077643 A) which teaches polymers and photoresist compositions.
- Roeschert et al. (US 6063545 A) which teaches a negative working radiation sensitive mixture.
- Watanabe et al. (US 6022665 A) which teaches polymers and chemically amplified positive resist compositions.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette M Clarke whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 7-5:30.


12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.


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13. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.

ymc   
May 20, 2002

  
JANET BAXTER  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700